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Federal Communications Commission
Office of Secretary

April 3, 1997

Mr. William F. Caton
Secretary
Federal Communications Commission
Room 222
1919 M Street, N.W.
Washington, D.C. 20554

EX PARTE

Re: CC Docket No. 96-45: Universal Service

Dear Mr. Caton:

Today, Michael Pelcovits, Christopher Frentrup, Mark Bryant and I of MCI, Richard Clarke and Michael Lieberman of AT&T, John Donovan of Telecom Visions and Richard Chandler of Hatfield Associates, Inc., met with William Sharkey, Brian Clopton, Patrick DeGraba, Anthony Bush and Vakunth Gupta of the FCC to discuss the attached materials.

Please include this letter and the attached materials on the record of this proceeding.

Sincerely,

Mary J. Sisak

Mary J. Sisak

Attachments

cc: William Sharkey
Brian Clopton
Patrick DeGraba
Anthony Bush
Vakunth Gupta
Paul Pederson
Rowland Curry
Sandra Makeeff
Brian Roberts
Lee Palagyi
Barry Payne
Charlie Bolle
Lori Kenyon

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List ABCDE

DRAFT -- 4/3/97
Some items still incomplete

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1. OVERVIEW

This draft document contains descriptions of the user-adjustable inputs to the Hatfield Model, version 3.1 ("HM3.1"). The inputs and assumptions in HM3.1 are based on documented information, expert engineering judgement, the opinion of expert estimators, or price quotes from suppliers and contractors.

Prices of telecommunications equipment and materials are notoriously difficult to obtain from manufacturers and large sales organizations. Although salespeople will occasionally provide "ballpark" prices, they will do so only informally and with the caveat that they may not be quoted and the company's identity must be concealed. It is very nearly impossible to obtain written, and hence "citable," price quotations, even for "list" prices, from vendors of equipment, cable and wire, and other items that are used in the telecommunications infrastructure. Part of the reason for this is that the vendors have long-standing relationships with the principal users of such equipment, the incumbent local exchange carriers ("ILECs"), and they apparently believe that public disclosure of any prices, list or discounted, might jeopardize these relationships. Further, they may fear retaliation by the ILECs if they were to provide pricing explicitly for use in cost models such as HM3.1.[1] The HM3.1 developers thus have often been forced to rely on informal discussions with vendor representatives and personal experience in purchasing or recommending such equipment and materials.

This document will continue to evolve as more documented sources are found to support the input values and assumptions.

2. DISTRIBUTION

2.1 Network Interface Device (NID)

Definition: The investment in the components of the network interface device (NID), the device at the customers' premises within which the drop wire terminates, and which is the point of subscriber demarcation.

Default Values:

NID Materials and Installation	
	Cost
Residential NID case, no protector	$10.00
Residential NID basic labor	$15.00
Installed NID case	*$25.00*
Maximum lines per res. NID	6
Protection block, per line	$4.00
Business NID case, no protector	$25.00
Business NID basic labor	$15.00
Installed NID case	*$40.00*
Protection block, per line	$4.00

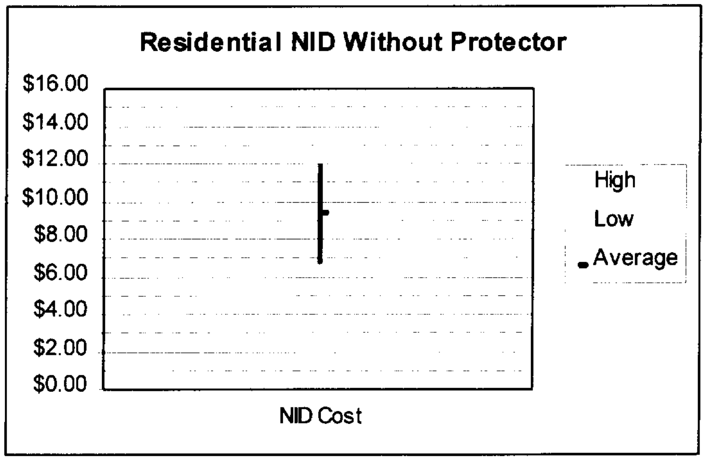
Support:

[1] See, for example, "U S West to Suppliers: Back Us or Lose Business," *Inter@ctive Week*, September 16, 1996.

Residential NID Cost without Protector:

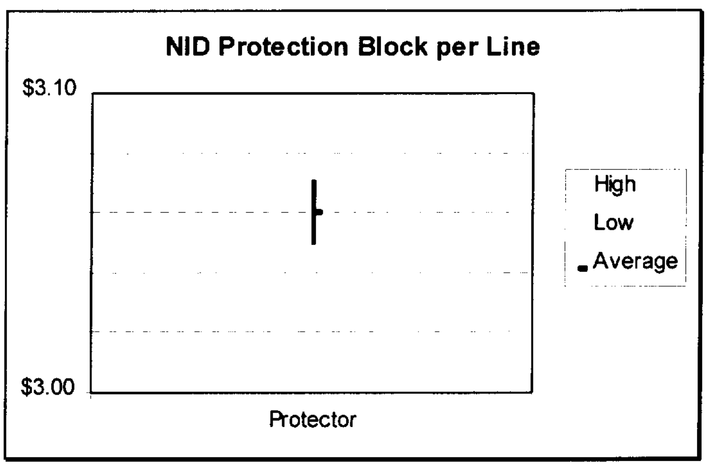
The labor estimate assumes a crew installing network interface devices throughout a neighborhood or CBG (in coordination with the installation of drops, terminals, and distribution cables). A work time of 25 minutes was used, based on the opinion of a team of outside plant experts. A loaded labor rate of $35 per hour excludes exempt material loadings which normally include the material cost of the NID and Drops.

Price quotes for material were as follows:



NID Protection Block per Line:

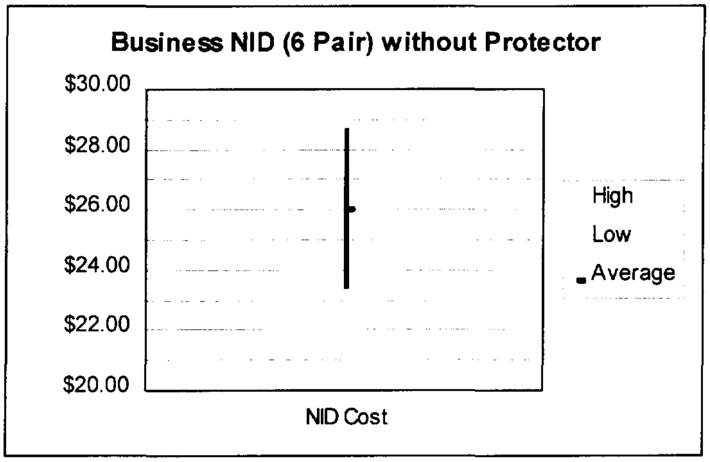
Price quotes for material were received from several sources. Results were as follows:



Business NID - No Protector:

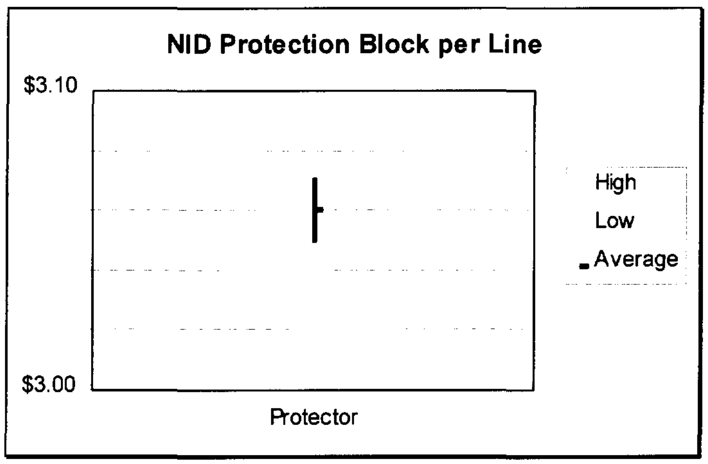
The labor estimate assumes a crew installing network interface devices throughout a neighborhood or CBG (in coordination with the installation of drops, terminals, and distribution cables). A work time of 25 minutes was used, based on the opinion of a team of outside plant experts. A loaded labor rate of $35 per hour excludes exempt material loadings which normally include the material cost of the NID and Drops.

Price quotes for material were as follows:



NID Protection Block per Line:

Price quotes for material were as follows:



2.2. DROP

2.2.1. Drop distance

Definition: A copper drop wire extends from the NID at the customer's premises to the block terminal at the distribution cable that runs along the street or the lot line. This parameter represents the average length of a drop cable in each of nine density zones.

Default Values:

Drop Distance by Density	
Density Zone	Drop Distance, feet
0-5	150
5-100	150
100-200	100
200-650	100
650-850	50
850-2,550	50
2,550-5,000	50
5,000-10,000	50
10,000+	50

Support: The Hatfield Model (HM) 3.1 assumes that drops are run from the front of the property line. House and building set-backs therefore determine drop length. Set-backs run from as low as 20 ft., in certain urban cases, to longer distances in more rural settings. While HM 3.1 assumes that lot sizes are twice as deep as they are wide, it is assumed that houses and buildings are normally placed towards the front of lots. Reasons for this include the cost of asphalt or cement driveways, unwillingness to remove snow from extremely long driveways in non-sunbelt areas, and the fact that private areas and gardens are usually situated in the backyard of a lot.

It should be noted that although exceptions to drop lengths may be observed, the model operates on average costs within density zones. The last nationwide study of actual loops produced results indicating that the average drop length is 73 feet.[2]

2.2.2. Drop Placement, Aerial and Buried

Definition: The total placement cost by density zone of an aerial drop wire, and the cost per foot for buried distribution cable placement, respectively.

Default Values:

Drop Placement, Aerial & Buried		
Density Zone	Aerial, total	Buried, per foot
0-5	$58.33	$0.75
5-100	$58.33	$0.75
100-200	$46.67	$0.75
200-650	$35.00	$0.75
650-850	$23.33	$0.75
850-2,550	$11.67	$0.75
2,550-5,000	$11.67	$1.13
5,000-10,000	$11.67	$1.50
10,000+	$11.67	$5.00

Support:

Aerial Drop Placement:

The opinions of expert outside plant engineers and estimators were used to project the amount of time

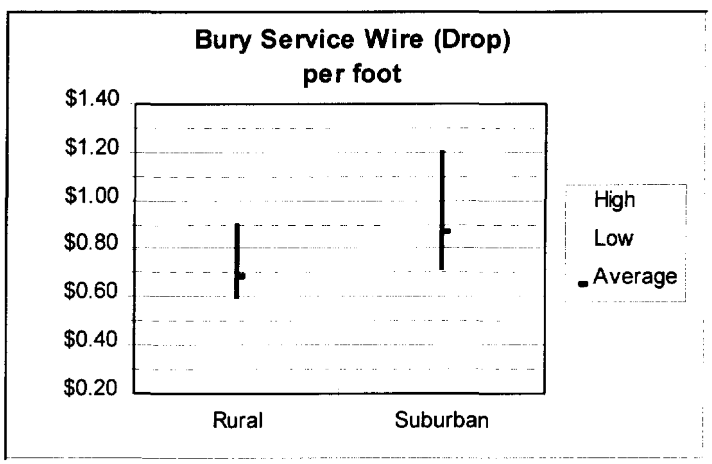
[2] Bellcore, *BOC Notes on the LEC Networks - 1994*, p. 12-9.

necessary to place aerial drop wires between an existing pole, and a building or house.
The labor estimate assumes a crew installing aerial drop wires throughout a neighborhood or CBG (in coordination with the installation of NIDs, terminals, and distribution cables). The loaded labor rate excludes exempt material loadings which normally include the material cost of the Aerial Drop Wire.

Aerial Drop Placement				
Density Zone	Aerial Drop Length (ft.)	Installation Time (min.)	Direct Loaded Labor Rate $/hr.	Aerial Total
0-5	150	150	$35	$58.33
5-100	150	150	$35	$58.33
100-200	100	80	$35	$46.67
200-650	100	60	$35	$35.00
650-850	50	40	$35	$23.33
850-2,550	50	20	$35	$11.67
2,550-5,000	50	20	$35	$11.67
5,000-10,000	50	20	$35	$11.67
10,000+	50	20	$35	$11.67

Buried Drop Placement

The contract labor estimate assumes a crew installing buried drop wires throughout a neighborhood or CBG (in coordination with the installation of NIDs, terminals, and distribution cables).
Price quotes for contractor placement of buried drop wire were as follows:



Because buried drops are rare in urban areas, Hatfield Associates estimate of this investment was used in lieu of verifiable forward looking alternatives from public sources or ILECs.

2.2.3. Buried Drop Sharing Fraction

Definition: The fraction of buried drop cost that is assigned to the telephone company. The other portion of the cost is borne by other utilities.

Default Value:

Buried Drop Sharing Fraction	
Density Zone	Fraction
0-5	1.00
5-100	1.00
100-200	1.00
200-650	1.00
650-850	1.00
850-2,550	1.00
2,550-5,000	1.00
5,000-10,000	1.00
10,000+	1.00

Support: Drop wires in new developments are most often placed in conjunction with other utilities to achieve cost sharing advantages, and to ensure that one service provider does not cut another's facilities during the trenching or plowing operation.

Conversations with architects and builders indicate that the builder will most often provide the trench at no cost, and frequently places electric, telephone, and cable television facilities into the trench if material is delivered on site. Research done in Arizona has indicated that developers not only provide trenches, but also provide small diameter PVC conduits across front property lines to facilitate placement of wires. , Even though opportunities may arise in new construction, and could justify a smaller allocation, the model presently uses no sharing of buried drop wire trench as a default value.

2.2.4. Drop Structure Fractions

Definition: The percentage of drops that are aerial and buried, respectively, as a function of CBG density zone.

Default Values:

Drop Structure Fractions		
Density Zone	Aerial	Buried
0-5	.25	.75
5-100	.25	.75
100-200	.25	.75
200-650	.30	.70
650-850	.30	.70
850-2,550	.30	.70
2,550-5,000	.30	.70
5,000-10,000	.60	.40
10,000+	.85	.15

Support: The Hatfield Model version 3.1 determines the use of structures based on density zones. It is the opinion of plant engineering experts that density, measured in Access Lines per Square Mile, is a good determinant of structure type. That judgment is based on the fact that increasing density drives more placement in developed areas, and that as developed areas become more dense, placements will more likely occur under pavement conditions.

2.2.5. Number of Lines per Business Location

Definition: The average number of business lines per business location, used to calculate NID and drop cost.

Default Value: 4

Support: The number of lines per business location estimated by Hatfield Associates is based on data in the *1995 Common Carrier Statistics* and the *1995 Statistical Abstract of the United States.*

2.2.6. Terminal and Splice Investment per line

Definition: The installed cost per line for the terminal and splice that connect the drop to the distribution cable.

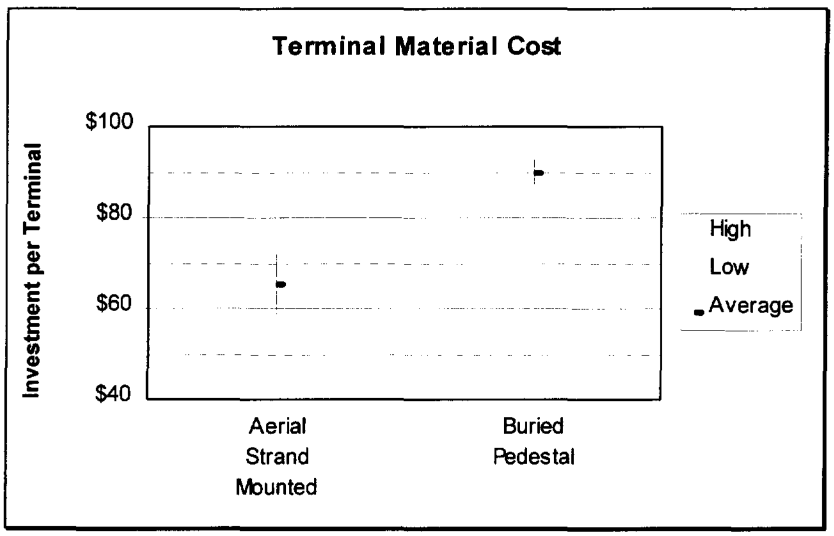
Default Value:

Terminal and Splice Investment per Line	
Buried	Aerial
$42.50	$32.00

Support: The figures above represent 25% of the cost of a terminal assuming a terminal is shared between four premises. The full cost is $170 Buried and $128 Aerial. HM 3.1 assigns this investment per line in all but the two lowest density zones, where the cost is doubled to represent two lines served per terminal.

The installed cost per line for the terminal and splice that provides for the connection of the drop to the distribution cable.

Price quotes for material were as follows:



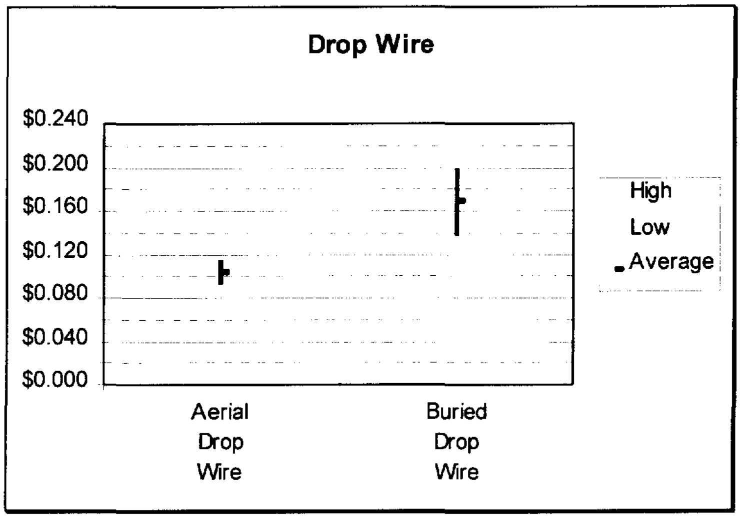
2.2.7. Drop Cable Investment, per foot and Pairs per Wire

Definition: The investment per foot required for aerial and buried drop wire, and the number of pairs in each type of drop wire.

Default Values:

Drop Cable Investment, per foot		
	Material Cost Per foot	Pairs
Aerial	$0.095	2
Buried	$0.140	3

Support: Price quotes for material were as follows:



2.3 CABLE AND RISER INVESTMENT

2.3.1. Distribution Cable Sizes

Definition: Distribution plant connects feeder plant, normally terminated at a Serving Area Interface (SAI), to the customer's Network Interface (NID). "Distribution network design requires more distribution pairs than feeder pairs, so distribution cables are more numerous, but smaller in cross section, than feeder cables."[3] The Hatfield Model default values represent the array of distribution cable sizes assumed to be available for placement in the network.

[3] Bellcore, *Telecommunications Transmission Engineering*, 1990, p. 91.

Default Values:

Cable Sizes
2400
1800
1200
900
600
400
200
100
50
25
12
6

Support: These are cable sizes typically available to, and used by, telephone companies. Although three additional sizes of distribution cable (2100 pair, 1500 pair, and 300 pair cable) can be used, the industry has largely abandoned use of those sizes in favor of reduced, simplified inventory.

2.3.2. Copper Distribution Cable, $/foot

Definition: The cost per foot of copper distribution cable, as a function of cable size, including the costs of engineering, installation, and delivery, as well as the cable material itself.

Default Values:

Copper Distribution Cable, $/foot	
Cable Size	Cost/foot (including engineering, installation, delivery and material)
2400	$42.75
1800	$32.25
1200	$21.75
900	$16.50
600	$11.25
400	$7.75
200	$4.25
100	$2.50
50	$1.63
25	$1.19
12	$0.76
6	$0.63

Support: Copper cables of 24 gauge and 26 gauge are the norm[4], although 22 gauge and 19 gauge are also used.[5] Rural distribution wire (C-Rural Wire) is also used on occasion, for long distances between cables and very rural customers.[6] Although 26 gauge cable can be used for distribution, the industry has largely

[4] Bellcore, *Telecommunications Transmission Engineering*, 1990, p. 91

[5] Bellcore, *BOC Notes on the LEC Networks - 1994*, p. 12-3.

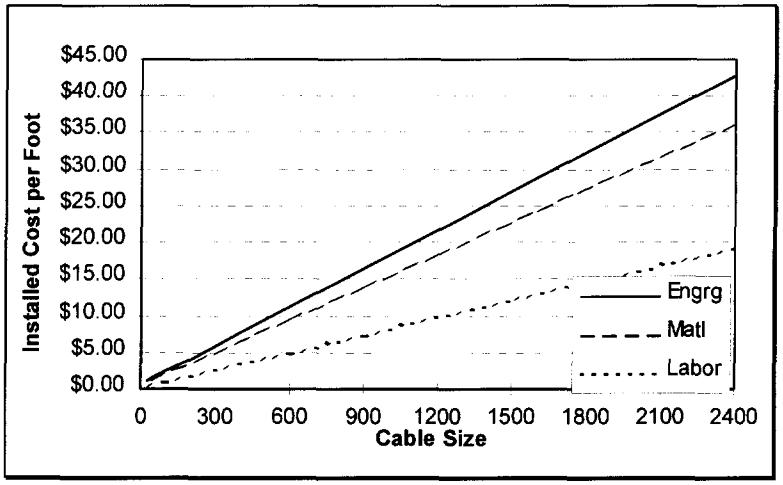
[6] Bellcore, *Telecommunications Transmission Engineering,* 1990, p. 91

standardized on 24 gauge copper for distribution because of its more flexible transmission capabilities, and because it is more durable in distribution plant that is more subject to handling (than feeder plant) by technicians in the field.

Outside plant planning engineers commonly assume that the cost of cable material can be represented as an a + bx straight line graph. In fact, Bellcore Planning tools, EFRAP I, EFRAP II, and LEIS:PLAN have the engineer develop such an a + bx equation to represent the cost of cable. As technology, manufacturing methods, and competition have advanced, the price of cable has been reduced. While in the past, the cost of copper cable was typically ($.50 + $.01 per pair) per foot, current costs are typically ($.30 + $.007 per pair) per foot.

In the opinion of expert outside plant engineers, material represents approximately 40% of the total installed cost. This is a widely used rule of thumb among outside plant engineers. Experience of outside plant experts used for developing the HM 3.1 includes writing and administering hundreds of outside plant "estimate cases" (undertakings over $35,000). Outside plant engineering experts have agreed that 40% material to total installed cost is a good approximation. Such expert opinions were also used to determine that the average engineering content for installed copper cable is 15% of the installed cost. The remaining 45% represents direct labor for placing and splicing cable, exclusive of the cost of splicing block terminals into the cable.[7]

The following chart represents the default values used in the model.



2.3.3. Riser Cable, $/foot

Definition: The cost per foot of copper riser cable (cable inside high-rise buildings), as a function of cable size, including the costs of engineering, installation, and delivery, as well as the cable material itself.

Default Values:

[7] The formula would produce a material price of $.34/ft. for 12 pair 24 gauge cable, and $.34/ft. for 6 pair 24 gauge cable. An actual quote for materials was obtained at $.18/ft. for 12 pair 24 gauge cable, and $.12/ft. for 6 pair 24 gauge cable. The significant difference in material cost is perceived to be the result of the very small quantity of sheath required for 12 and 6 pair cables. Therefore, the formula generated material price was reduced by $.20 and $.22 for 12 and 6 pair cables respectively, but the engineering and labor components were retained at original formula levels, since neither would be affected by the reduction in material price.

Riser Cable, $/foot	
Cable Size	Cost/foot (including engineering, installation, delivery and material)
2400	$42.75
1800	$32.25
1200	$21.75
900	$16.50
600	$11.25
400	$7.75
200	$4.25
100	$2.50
50	$1.63
25	$1.19
12	$0.76
6	$0.63

Support: Riser cable is assumed to cost the same per foot as equivalent-sized distribution cable.

2.4. POLES AND CONDUIT

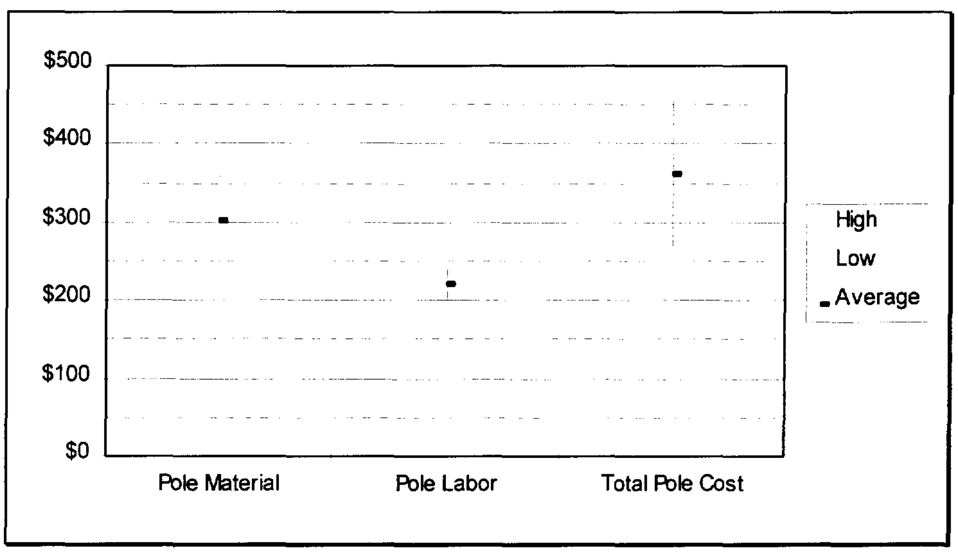
2.4.1. Pole Investment

Definition: The installed cost of a 40 foot Class 4 treated southern pine utility pole.

Default Value:

Pole Investment	
Materials	$201
Labor	$216
Total	*$417*

Support: Pole investment is a function of the material and labor costs of placing a pole. Costs include periodic down-guys and anchors. Utility poles can be purchased and installed by employees of ILECs, but are frequently placed by contractors. Several sources revealed the following information on prices.



2.4.2. Buried Copper Cable Sheath Multiplier (feeder and distribution)

Definition: The additional cost of the filling compound used in buried cable to protect the cable from moisture expressed as a multiplier of the cost of non-armored cable.

Default Value: 1.04

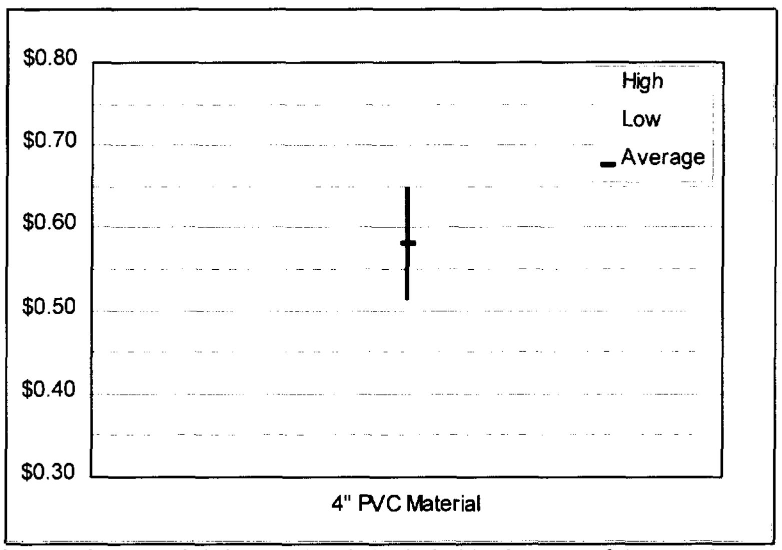
Support: Filled cable is designed to minimize moisture penetration in buried plant. This factor accounts for the extra material cost incurred by using a more expensive type of cable designed specifically for buried application.

2.4.3. Conduit Material Investment per foot

Definition: Material cost per foot of 4" PVC pipe.

Default Value: $0.60

Support: Several suppliers were contacted for material prices. Results are shown below.



The labor to place conduit in trenches is included in the cost of the trench. Trenching prices include digging the trench, placing the conduit, stabilizing the conduit, back-filling the trench with appropriately screened soil, and restoring surface conditions.

Using forward-looking technology, a few copper cables serving short distances (e.g., less than 9,000 ft. feeder cable length), and one or more fiber cables to serve longer distances will be needed. Since the number of cables in each of the four feeder routes is relatively small, the predominant cost is that of the trench, plus the material cost of a few additional plastic conduit pipes.

2.4.4. Spare Tubes per Route (distribution)

Definition: The number of spare tubes (i.e., conduit) placed per route.

Default Value: 1

Support: "A major advantage of using conduits is the ability to reuse cable spaces without costly excavation by removing smaller, older cables and replacing them with larger cables or fiber facilities.

Some companies reserve vacant ducts for maintenance purposes."[8] Version 3.1 of the Hatfield Model provides one spare maintenance duct (as a default) in each conduit run.

2.4.5. Regional Labor Adjustment Factor

Definition: A factor that adjusts the labor cost portion of certain investments to account for regional differences in the availability of trained labor, union contracts, and cost of living factors.

Default Value: 1.0

Support: Different areas of the country are known to experience variations in wages paid to technicians, depending on availability of trained labor, union contracts, and cost of living factors. The adjustment applies only to that portion of installed costs pertaining to salaries. It does not apply to loading factors such as exempt material, construction machinery, motor vehicles, leases and rentals of special tools and work equipment, welfare, pension, unemployment insurance, workers compensation insurance, liability insurance, general contractor overheads, subcontractor overheads, and taxable & non-taxable fringe benefits.

The regional adjustment factor is applied to the model as follows. For heavy construction of outside plant cable, the model assumes a fully loaded direct labor cost of $55.00 per hour for a placing or splicing technician who receives pay of $20 per hour. For copper feeder and copper distribution cable, the Hatfield Model assumes that this fully loaded direct labor component accounts for 45% of the investment.

Because $20 is 36.4% of the fully loaded $55 per hour figure, the effect of the Regional labor Adjustment Factor is .364 x .45, or 16.4% of the installed cost of copper cable. Therefore, the labor adjustment factor is applied to 16.4% of the installed cost of copper cable.

The labor adjustment factor also applies to pole labor, NID installation, conduit and buried placement, and drop installation. In the feeder plant, the factor applies to manhole and pullbox installation as well as to cable and other structure components.

Application of Regional Labor Adjustment Factor on Buried Installation			
Density Zone	Buried Installation per foot	Labor Content Affected	Investment Affected per foot
0-5	$1.77	0.125	$0.2213
5-100	$1.77	0.125	$0.2213
100-200	$1.77	0.125	$0.2213
200-650	$1.93	0.125	$0.2413
650-850	$2.17	0.125	$0.2713
850-2,550	$3.54	0.125	$0.4425
2,550-5,000	$4.27	0.125	$0.5338
5,000-10,000	$13.00	0.125	$1.6250
10,000+	$45.00	0.125	$5.6250

Contract labor is used for buried trenching, conduit trenching, and manhole/pullbox excavation. Contract labor (vs. equipment + other charges) is 25% of total contractor cost. Direct salaries are 50% of the "labor

[8] *BOC Notes on the LEC Networks - 1994*, Bellcore, p. 12-42.

& benefits" cost. Therefore, the Regional Labor Adjustment Factor is 0.125 of the trenching and excavation costs.

Application of Regional Labor Adjustment Factor on Conduit Installation			
Density Zone	Conduit Installation per foot	Labor Content Affected	Investment Affected per foot
0-5	$10.29	0.125	$1.2863
5-100	$10.29	0.125	$1.2863
100-200	$10.29	0.125	$1.2863
200-650	$11.35	0.125	$1.4188
650-850	$11.38	0.125	$1.4225
850-2,550	$16.40	0.125	$2.0500
2,550-5,000	$21.60	0.125	$2.7000
5,000-10,000	$50.10	0.125	$6.2625
10,000+	$75.00	0.125	$9.3750

Application of Regional Labor Adjustment Factor on Manhole Installation			
Density Zone	Manhole Excavation & Backfill	Labor Content Affected	Investment Affected per foot
0-5	$2,800	0.125	$350
5-100	$2,800	0.125	$350
100-200	$2,800	0.125	$350
200-650	$2,800	0.125	$350
650-850	$3,200	0.125	$400
850-2,550	$3,500	0.125	$438
2,550-5,000	$3,500	0.125	$438
5,000-10,000	$5,000	0.125	$625
10,000+	$5,000	0.125	$625

Application of Regional Labor Adjustment Factor on Fiber Pullbox Installation			
Density Zone	Pullbox Excavation & Backfill	Labor Content Affected	Investment Affected per foot
0-5	$220	0.125	$27.50
5-100	$220	0.125	$27.50
100-200	$220	0.125	$27.50
200-650	$220	0.125	$27.50
650-850	$220	0.125	$27.50
850-2,550	$220	0.125	$27.50
2,550-5,000	$220	0.125	$27.50
5,000-10,000	$220	0.125	$27.50
10,000+	$220	0.125	$27.50

Application of Regional Labor Adjustment Factor on Copper Distribution Cable Installation			
Copper Distribution Cable Size	Installed Copper Distribution Cost	Labor Content Affected	Investment Affected per foot
2,400	$42.75	0.164	$7.01
1,800	$32.25	0.164	$5.29
1,200	$21.75	0.164	$3.57
900	$16.50	0.164	$2.71
600	$11.25	0.164	$1.85
400	$7.75	0.164	$1.27
200	$4.25	0.164	$.70
100	$2.50	0.164	$.41
50	$1.63	0.164	$.27
25	$1.19	0.164	$.20
12	$.76	0.201	$0.15
6	$.63	0.219	$0.14

Application of Regional Labor Adjustment Factor on Copper Feeder Cable Installation			
Copper Feeder Cable Size	Installed Copper Feeder Cost	Labor Content Affected	Investment Affected per foot
4,200	$74.25	0.164	$12.18
3,600	$63.75	0.164	$10.46
3,000	$53.25	0.164	$8.73
2,400	$42.75	0.164	$7.01
1,800	$32.25	0.164	$5.29
1,200	$21.75	0.164	$3.57
900	$16.50	0.164	$2.71
600	$11.25	0.164	$1.85
400	$7.75	0.164	$1.27
200	$4.25	0.164	$0.70
100	$2.50	0.164	$0.41

Application of Regional Labor Adjustment Factor on Fiber Feeder Cable Installation				
Fiber Feeder Cable Size	Installed Fiber Feeder Cost	Labor Content Affected	Factor	Investment Affected per foot
216	$13.10	$2.00	0.364	$0.73
144	$9.50	$2.00	0.364	$0.73
96	$7.10	$2.00	0.364	$0.73
72	$5.90	$2.00	0.364	$0.73
60	$5.30	$2.00	0.364	$0.73
48	$4.70	$2.00	0.364	$0.73
36	$4.10	$2.00	0.364	$0.73
24	$3.50	$2.00	0.364	$0.73
18	$3.20	$2.00	0.364	$0.73
12	$2.90	$2.00	0.364	$0.73

Application of Regional Labor Adjustment Factor on Outdoor SAI Installation			
Outdoor SAI Distribution Cable Size	Installed Outdoor SAI	Labor Content Affected	Investment Affected per foot
2,400	$4,469	0.164	$733
1,800	$3,569	0.164	$585
1,200	$2,610	0.164	$428
900	$2,028	0.164	$333
600	$1,500	0.164	$246
400	$1,071	0.164	$176
200	$902	0.164	$148
100	$642	0.164	$105
50	$300	0.164	$49
25	$250	0.164	$.41
12	$250	0.164	$41
6	$250	0.164	$41

Application of Regional Labor Adjustment Factor on Indoor SAI Installation			
Indoor SAI Distribution Cable Size	Installed Indoor SAI	Labor Content Affected	Investment Affected per foot
2,400	$1,052	0.164	$733
1,800	$864	0.164	$585
1,200	$576	0.164	$428
900	$432	0.164	$333
600	$288	0.164	$246
400	$192	0.164	$176
200	$96	0.164	$148
100	$48	0.164	$105
50	$48	0.164	$49
25	$48	0.164	$.41
12	$48	0.201	$41
6	$48	0.219	$41

Application of Regional Labor Adjustment Factor on NID Installation			
Type of NID	NID Basic Labor	Labor Content Affected	Investment Affected per foot
Residence	$15.00	0.571	$8.57
Business	$15.00	0.571	$8.57

Telco Installation & Repair labor (Drop & NID installation): Regional Labor Adjustment

Factor applies to $20 of the $35 loaded labor rate (exclusive of exempt material loadings).

Application of Regional Labor Adjustment Factor on Aerial Drop Installation			
Density Zone	Installed Aerial Drop	Labor Content Affected	Investment Affected per foot
0-5	$58.33	0.571	$33.33
5-100	$58.33	0.571	$33.33
100-200	$46.67	0.571	$26.67
200-650	$35.00	0.571	$20.00
650-850	$23.33	0.571	$13.33
850-2,550	$11.67	0.571	$6.67
2,550-5,000	$11.67	0.571	$6.67
5,000-10,000	$11.67	0.571	$6.67
10,000+	$11.67	0.571	$6.67

Application of Regional Labor Adjustment Factor on Buried Drop Installation			
Density Zone	Installed Buried Drop per foot	Labor Content Affected	Investment Affected per foot
0-5	$0.75	0.125	$0.094
5-100	$0.75	0.125	$0.094
100-200	$0.75	0.125	$0.094
200-650	$0.75	0.125	$0.094
650-850	$0.75	0.125	$0.094
850-2,550	$0.75	0.125	$0.094
2,550-5,000	$1.13	0.125	$0.141
5,000-10,000	$1.50	0.125	$0.188
10,000+	$5.00	0.125	$0.625

The following chart shows recommended default values for each state.

Regional Labor Adjustment Factor:

Direct Labor costs vary among regions in the United States. A variety of sources can be used for labor adjustment factors.[9] The following statewide labor adjustment factor indexes can be used as default values:

State	Factor[10*]

[9] See, for example, Square Foot Costs, 18th Annual Edition, R.S. Means Company, Inc., 1996, p.429-433.

[10] Martin D. Kiley and Marques Allyn, eds., *1997 National Construction Estimator 45th Edition*, pp. 12-15. [Normalized for New York State as 1.00]

Alaska	1.25
Hawaii	1.22
Massachusetts	1.09
California	1.07
Michigan	1.01
New York	1.00
New Jersey	1.00
Rhode Island	1.00
Illinois	1.00
Minnesota	0.99
Connecticut	0.98
Pennsylvania	0.97
Nevada	0.95
Washington (State)	0.92
Oregon	0.92
Delaware	0.92
Indiana	0.92
Missouri	0.90
Maryland	0.89
New Hampshire	0.86
Montana	0.85
West Virginia	0.84
Ohio	0.83
Wisconsin	0.83
Arizona	0.81
Colorado	0.77
New Mexico	0.76
Vermont	0.75
Iowa	0.74
North Dakota	0.74
Idaho	0.73
Maine	0.73
Kentucky	0.73
Louisiana	0.72
Kansas	0.71
Utah	0.71
Tennessee	0.70
Oklahoma	0.69
Florida	0.68
Virginia	0.67
Nebraska	0.65
Texas	0.65
South Dakota	0.64
Georgia	0.62
Arkansas	0.61
Wyoming	0.60